

APPENDIX 2: Data of EMI test

Conducted Emission

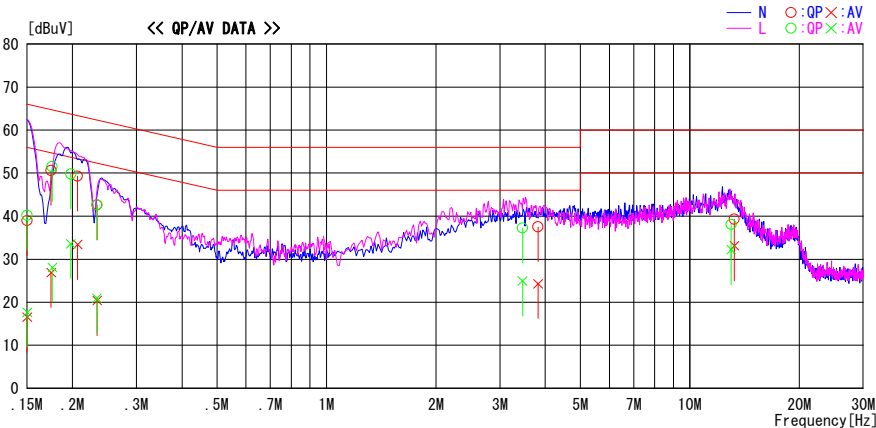
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2011/08/04

Report No. : 31JE0273-H0-01
Temp./Humi. : 24deg. C / 55% RH
Engineer : Hironobu Ohnishi

Mode / Remark HRP Tx 60.48GHz

LIMIT : FCC15.207 QP
FCC15.207 AV

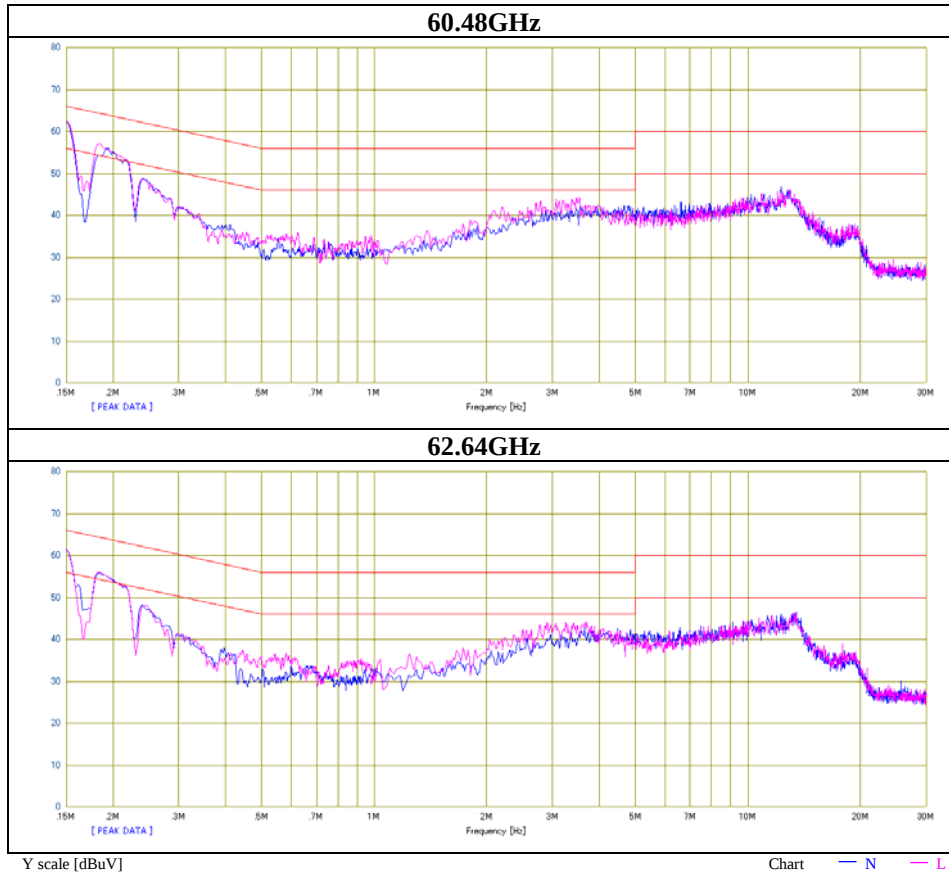


Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	25.7	3.2	13.3	39.0	16.5	66.0	56.0	27.0	39.5	N	
0.17481	37.3	13.6	13.3	50.6	26.9	64.7	54.7	14.1	27.8	N	
0.20660	36.0	20.1	13.3	49.3	33.4	63.3	53.3	14.0	19.9	N	
0.23392	29.3	7.1	13.3	42.6	20.4	62.3	52.3	19.7	31.9	N	
3.81980	23.9	10.7	13.6	37.5	24.3	56.0	46.0	18.5	21.7	N	
13.26800	25.0	18.8	14.3	39.3	33.1	60.0	50.0	20.7	16.9	N	
0.15000	26.9	4.4	13.3	40.2	17.7	66.0	56.0	25.8	38.3	L	
0.17583	38.2	14.8	13.3	51.5	28.1	64.7	54.7	13.2	26.6	L	
0.19800	36.5	20.3	13.3	49.8	33.6	63.7	53.7	13.9	20.1	L	
0.23350	29.3	7.6	13.3	42.6	20.9	62.3	52.3	19.7	31.4	L	
3.46260	23.7	11.3	13.6	37.3	24.9	56.0	46.0	18.7	21.1	L	
13.00200	23.8	17.9	14.3	38.1	32.2	60.0	50.0	21.9	17.8	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F[dB] (LISN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

Conducted Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	31JE0273-HO-01
Date	08/04/2011
Temperature/ Humidity	24 deg. C / 55% RH
Engineer	Hironobu Ohnishi
Mode	HRP Tx



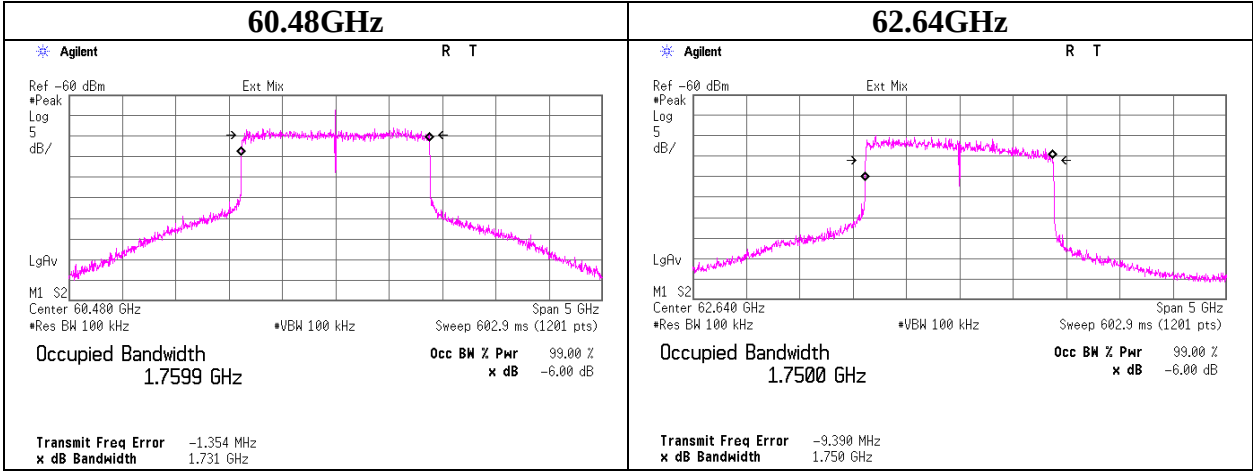
6dB Bandwidth

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 31JE0273-HO-01
Date 08/01/2011
Temperature/ Humidity 25 deg. C / 75% RH
Engineer Hironobu Ohnishi
Mode Tx

Mode	Channel	Frequency [GHz]	6dB Bandwidth [MHz]
LRP	Low	60.321375	90.347
	Mid	60.480000	91.128
	High	60.638625	91.407
HRP	2	60.480000	1731.000
LRP	Low	62.481375	90.810
	Mid	62.640000	90.874
	High	62.798625	90.726
HRP	3	62.640000	1750.000

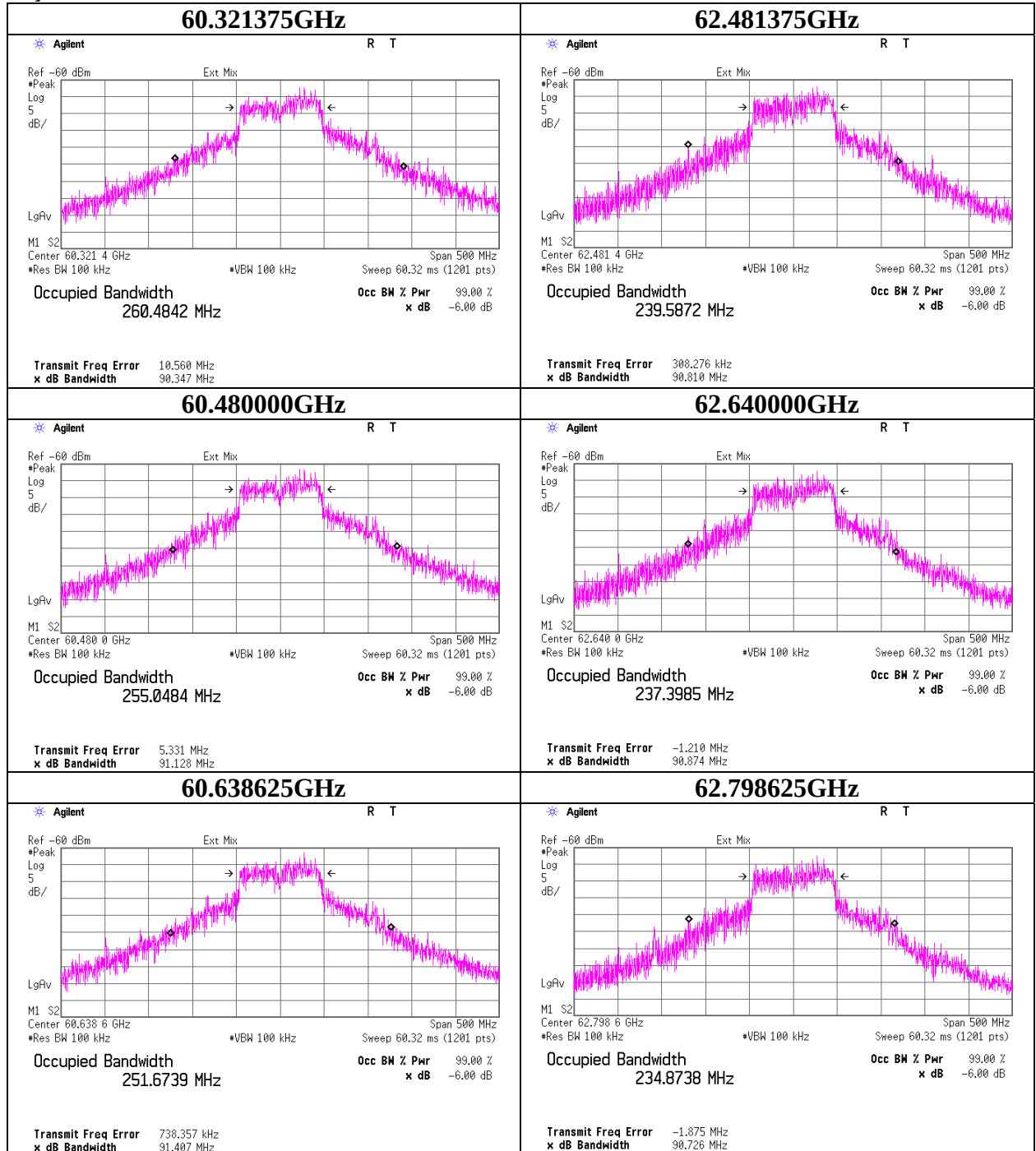
6dB Bandwidth

[HRP]



6dB Bandwidth

[LRP]



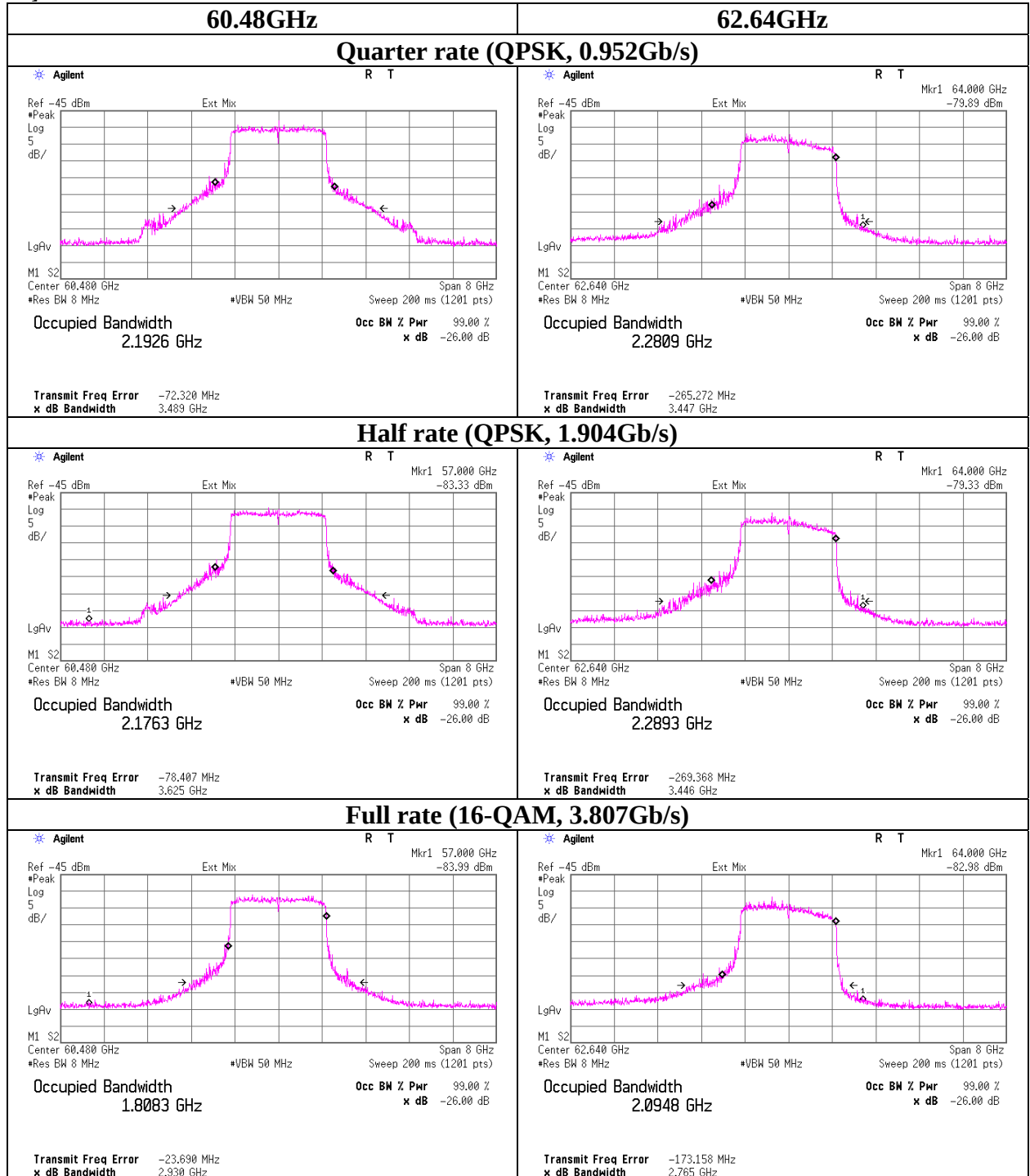
26dB and 99% Bandwidth

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 31JE0273-HO-01
Date : 08/01/2011
Temperature/ Humidity : 25 deg. C / 75% RH
Engineer : Hironobu Ohnishi
Mode : Tx

Mode	Rate	Channel	Frequency [GHz]	26dB Bandwidth [MHz]	99% Bandwidth [MHz]
LRP	-	Low	60.321375	393.755	305.236
		Mid	60.480000	397.102	299.558
		High	60.638625	399.730	301.745
HRP	Quarter	2	60.480000	3489.000	2192.600
	Half			3625.000	2176.300
	Full			2930.000	1808.300
LRP	-	Low	62.481375	399.413	287.298
		Mid	62.640000	384.673	287.130
		High	62.798625	392.538	287.635
HRP	Quarter	3	62.640000	3447.000	2280.900
	Half			3446.000	2289.300
	Full			2765.000	2094.800

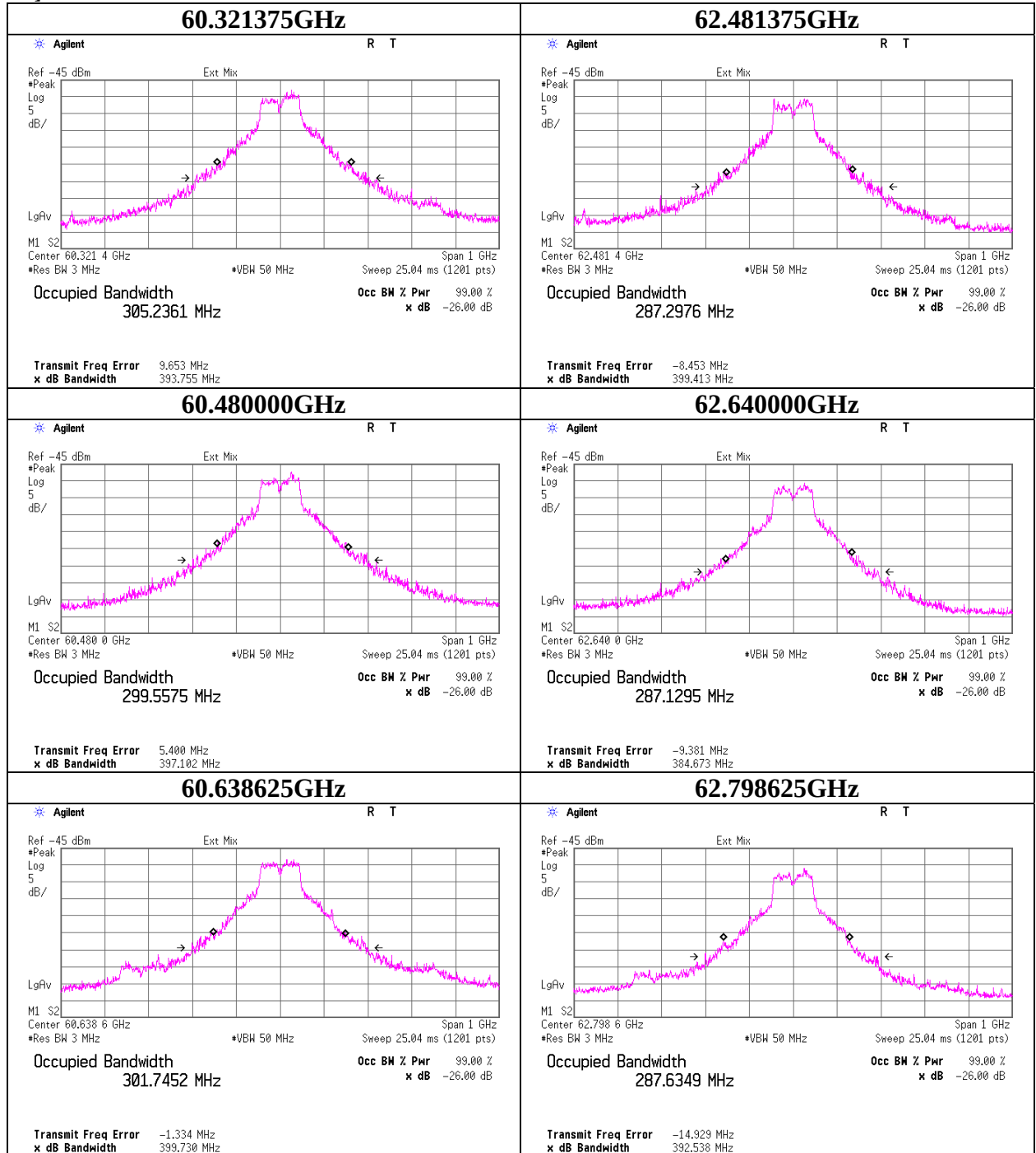
26dB and 99% Bandwidth

[HRP]



26dB and 99% Bandwidth

[LRP]



Power Density

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 31JE0273-HO-01
Date : 08/01/2011
Temperature/ Humidity : 25 deg. C / 75% RH
Engineer : Hironobu Ohnishi
Mode : Tx

[Peak result]

Mode	Channel	Frequency [GHz]	Measurement Distance [m]	Measured Power [dBm]	Rx Antenna Gain [dBi]	System Loss [dB]	LNA Gain [dB]	Free field Attenuation [dB]	EIRP [dBm] [mW]		Specification Distance [m]	Power Density [uW/cm ²]	Limit Pk Av [uW/cm ²] [uW/cm ²]	
LRP	Low	60.321375	1.5	-35.31	24.23	44.25	27.16	71.57	29.12	816.7	3.0	0.722	18	9
	Mid	60.480000	1.5	-34.63	24.25	44.37	27.27	71.60	29.81	957.7	3.0	0.847	18	9
	High	60.638625	1.5	-34.68	24.26	44.49	27.39	71.62	29.77	949.2	3.0	0.839	18	9
HRP	2	60.480000	1.5	-27.04	24.25	44.37	27.27	71.60	37.40	5498.1	3.0	4.861	18	9
LRP	Low	62.481375	1.5	-37.08	24.50	45.08	26.50	71.88	28.88	773.2	3.0	0.684	18	9
	Mid	62.640000	1.5	-37.54	24.53	45.27	26.41	71.90	28.69	739.9	3.0	0.654	18	9
	High	62.798625	1.5	-38.25	24.56	45.47	26.33	71.92	28.25	668.4	3.0	0.591	18	9
HRP	3	62.640000	1.5	-29.91	24.53	45.27	26.41	71.90	36.32	4287.4	3.0	3.791	18	9

Calculating formula:

Free Field Attenuation = $10 * \log((4 * \pi * \text{Measurement Distance} / \text{rambda})^2)$
EIRP = Measured Power - Rx Antenna Gain + System Loss - LNA Gain + Free Field Attenuation
Power Density = EIRP / $(4 * \pi * \text{Specification Distance}^2)$

* The peak power density complies with both peak and average limits.

[Average result for MPE]

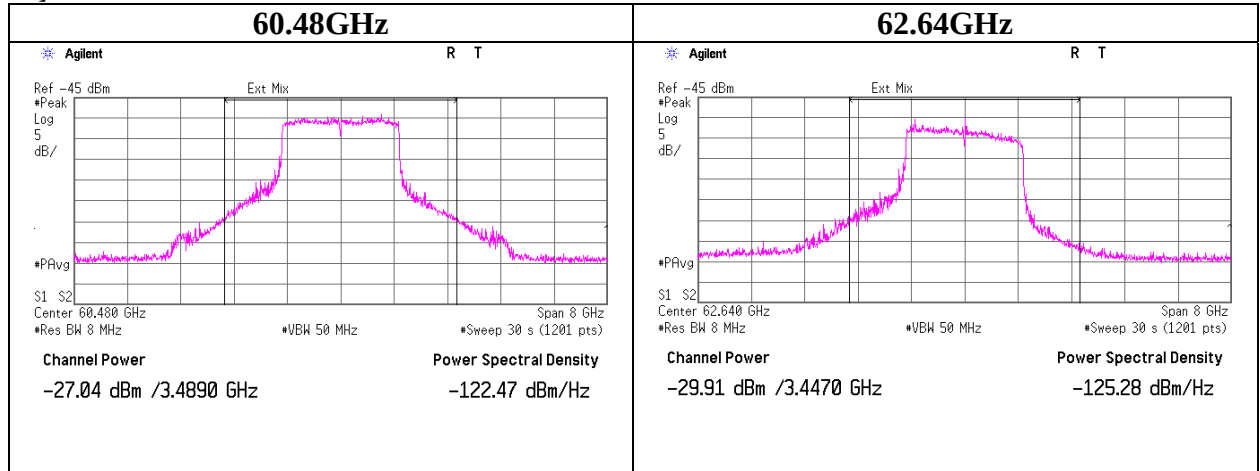
Mode	Channel	Frequency [GHz]	Measurement Distance [m]	Measured Power [dBm]	Rx Antenna Gain [dBi]	System Loss [dB]	LNA Gain [dB]	Free field Attenuation [dB]	EIRP [dBm] [mW]		Specification Distance [m]	Power Density [uW/cm ²]	Limit Pk Av [uW/cm ²] [uW/cm ²]	
HRP	2	60.480000	1.5	-36.70	24.25	44.37	27.27	71.60	27.74	594.6	3.0	0.526	-	9
HRP	3	62.640000	1.5	-39.61	24.53	45.27	26.41	71.90	26.62	459.4	3.0	0.406	-	9

Calculating formula:

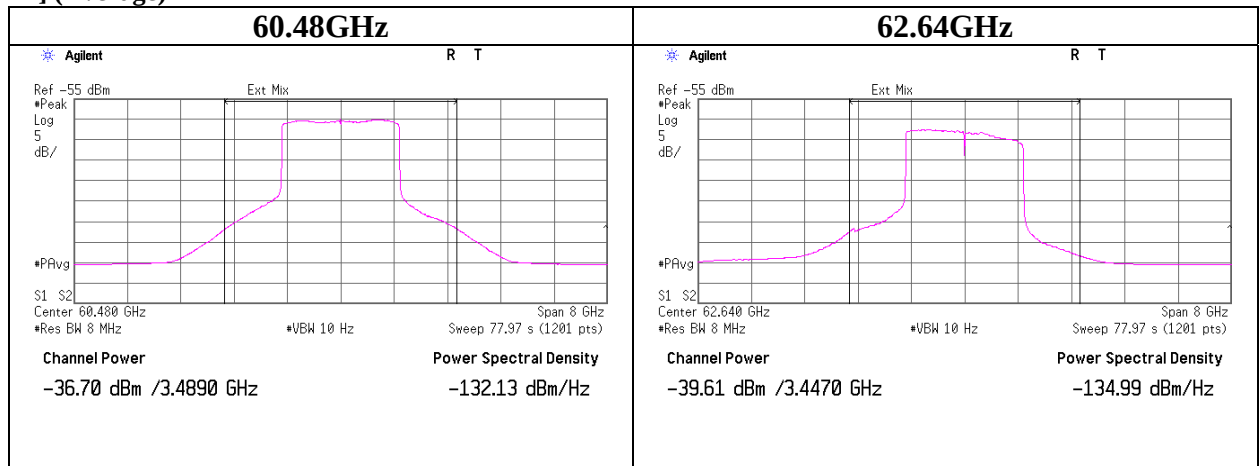
Free Field Attenuation = $10 * \log((4 * \pi * \text{Measurement Distance} / \text{rambda})^2)$
EIRP = Measured Power - Rx Antenna Gain + System Loss - LNA Gain + Free Field Attenuation
Power Density = EIRP / $(4 * \pi * \text{Specification Distance}^2)$

Power Density

[HRP]

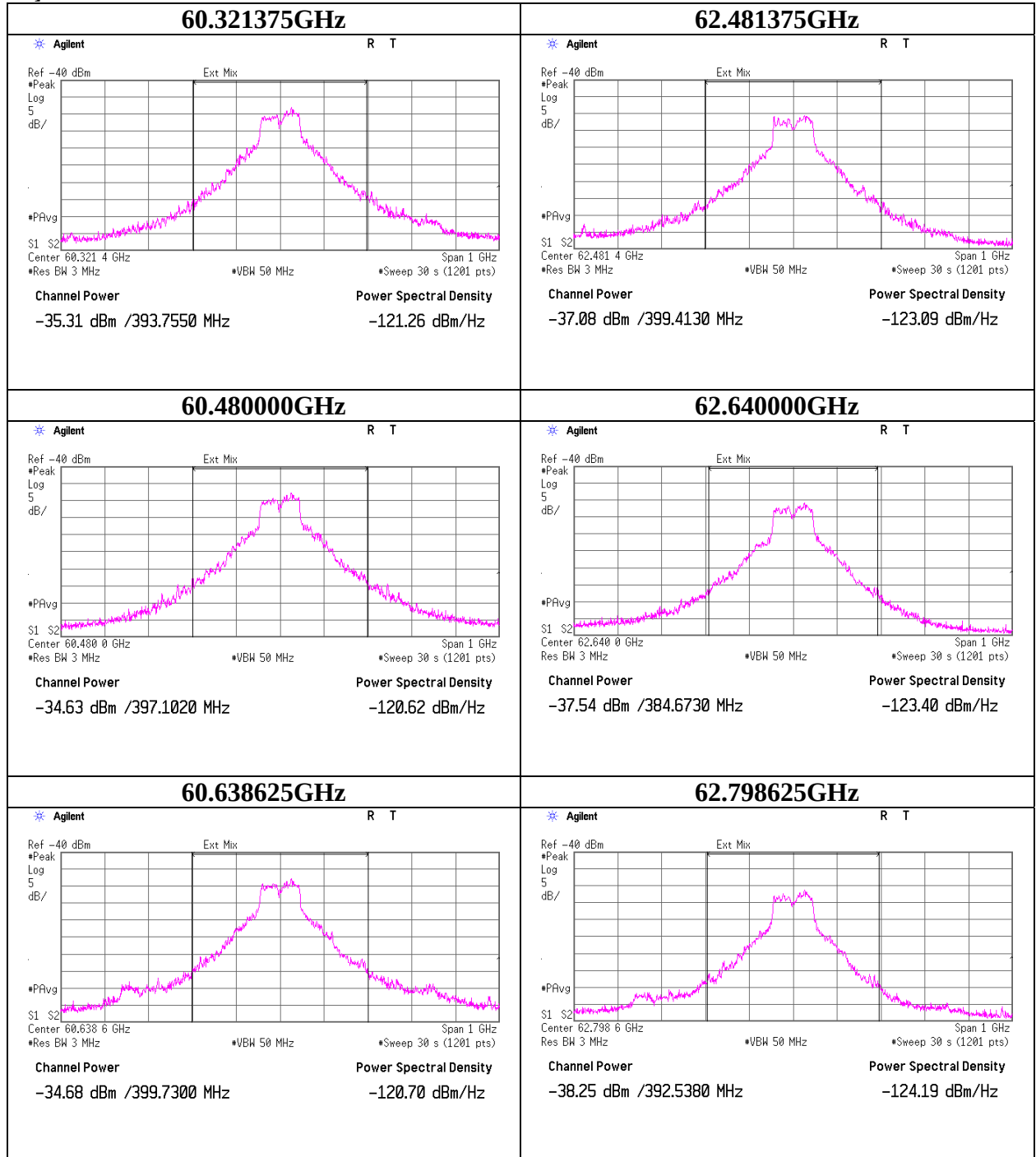


[HRP] (Average)



Power Density

[LRP]



Peak Output Power

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 31JE0273-HO-01
Date : 08/01/2011
Temperature/ Humidity : 25 deg. C / 75% RH
Engineer : Hironobu Ohnishi
Mode : Tx

Mode	Channel	Frequency [GHz]	EIRP [dBm]	EUT Antenna Gain [dBi]	Output Power		6dB Bandwidth [MHz]	Output Power Limit [mW]
LRP	Low	60.321375	29.12	16.00	13.12	20.51	90.347	451.74
	Mid	60.480000	29.81	16.00	13.81	24.06	91.128	455.64
	High	60.638625	29.77	16.00	13.77	23.84	91.407	457.04
HRP	2	60.480000	37.40	22.00	15.40	34.69	1731.000	500.00
LRP	Low	62.481375	28.88	16.00	12.88	19.42	90.810	454.05
	Mid	62.640000	28.69	16.00	12.69	18.59	90.874	454.37
	High	62.798625	28.25	16.00	12.25	16.79	90.726	453.63
HRP	3	62.640000	36.32	22.00	14.32	27.05	1750.000	500.00

Calculating formula:

Output Power = EIRP - EUT Antenna Gain

Output Power Limit = 6dB Bandwidth * 500mW / 100MHz; (when 6dB Bandwidth less than 100MHz)

Spurious Emission

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 31JE0273-HO-01
Date 07/25/2011 07/26/2011 08/05/2011
Temperature/ Humidity 26 deg. C / 64% RH 25 deg. C / 67% RH 25 deg. C / 75% RH
Engineer Hironobu Ohnishi Takeshi Choda Hironobu Ohnishi
(30-1000MHz) (9k-30MHz, 1-18GHz) (18-40GHz)
Mode HRP Tx 60.48GHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	95.960	QP	40.5	9.6	7.9	32.2	25.8	43.5	17.7	
Hori	133.120	QP	34.6	14.1	8.4	32.1	25.0	43.5	18.5	
Hori	214.765	QP	38.4	16.9	9.1	32.0	32.4	43.5	11.1	
Hori	357.942	QP	40.1	16.8	10.1	32.1	34.9	46.0	11.1	
Hori	445.487	QP	44.9	18.3	10.7	32.1	41.8	46.0	4.2	
Hori	890.974	QP	35.7	24.0	13.0	31.3	41.4	46.0	4.6	
Hori	1039.481	PK	63.0	23.9	1.6	34.7	53.8	73.9	20.1	
Hori	1484.937	PK	62.8	25.8	2.0	33.4	57.2	73.9	16.7	
Hori	2970.019	PK	53.1	27.9	2.8	32.0	51.8	73.9	22.1	
Hori	3712.385	PK	54.9	29.5	3.2	31.7	55.9	73.9	18.0	
Hori	10151.970	PK	54.1	38.6	-4.1	33.3	55.3	73.9	18.6	
Hori	12095.960	PK	48.1	39.3	-3.6	33.2	50.6	73.9	23.3	
Hori	24192.000	PK	47.3	38.7	-0.9	31.6	53.5	73.9	20.4	
Hori	36288.000	PK	46.3	42.2	0.3	24.9	63.9	73.9	10.0	NS
Hori	1039.481	AV	56.6	23.9	1.6	34.7	47.4	53.9	6.5	
Hori	1484.937	AV	58.5	25.8	2.0	33.4	52.9	53.9	1.0	
Hori	2970.019	AV	45.5	27.9	2.8	32.0	44.2	53.9	9.7	
Hori	3712.385	AV	39.8	29.5	3.2	31.7	40.8	53.9	13.1	
Hori	10151.970	AV	49.6	38.6	-4.1	33.3	50.8	53.9	3.1	
Hori	12095.960	AV	41.8	39.3	-3.6	33.2	44.3	53.9	9.6	
Hori	24192.000	AV	35.7	38.7	-0.9	31.6	41.9	53.9	12.0	
Hori	36288.000	AV	33.8	42.2	0.3	24.9	51.4	53.9	2.5	NS
Vert	94.320	QP	43.5	9.3	7.9	32.2	28.5	43.5	15.0	
Vert	133.120	QP	40.4	14.1	8.4	32.1	30.8	43.5	12.7	
Vert	214.765	QP	41.6	16.9	9.1	32.0	35.6	43.5	7.9	
Vert	357.942	QP	33.5	16.8	10.1	32.1	28.3	46.0	17.7	
Vert	445.487	QP	35.8	18.3	10.7	32.1	32.7	46.0	13.3	
Vert	890.974	QP	34.4	24.0	13.0	31.3	40.1	46.0	5.9	
Vert	1039.481	PK	63.5	23.9	1.6	34.7	54.3	73.9	19.6	
Vert	1484.937	PK	58.5	25.8	2.0	33.4	52.9	73.9	21.0	
Vert	2970.019	PK	53.8	27.9	2.8	32.0	52.5	73.9	21.4	
Vert	3712.385	PK	57.7	29.5	3.2	31.7	58.7	73.9	15.2	
Vert	10151.970	PK	53.1	38.6	-4.1	33.3	54.3	73.9	19.6	
Vert	12095.960	PK	46.6	39.3	-3.6	33.2	49.1	73.9	24.8	
Vert	24192.000	PK	48.2	38.7	-0.9	31.6	54.4	73.9	19.5	
Vert	36288.000	PK	45.6	42.2	0.3	24.9	63.2	73.9	10.7	NS
Vert	1039.481	AV	57.3	23.9	1.6	34.7	48.1	53.9	5.8	
Vert	1484.937	AV	53.4	25.8	2.0	33.4	47.8	53.9	6.1	
Vert	2970.019	AV	49.7	27.9	2.8	32.0	48.4	53.9	5.5	
Vert	3712.385	AV	42.5	29.5	3.2	31.7	43.5	53.9	10.4	
Vert	10151.970	AV	48.8	38.6	-4.1	33.3	50.0	53.9	3.9	
Vert	12095.960	AV	40.2	39.3	-3.6	33.2	42.7	53.9	11.2	
Vert	24192.000	AV	36.5	38.7	-0.9	31.6	42.7	53.9	11.2	
Vert	36288.000	AV	33.8	42.2	0.3	24.9	51.4	53.9	2.5	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

*NS: No signal detect.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Spurious Emission

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 31JE0273-HO-01
Date : 07/25/2011 07/26/2011 08/05/2011
Temperature/ Humidity : 26 deg. C / 64% RH 25 deg. C / 67% RH 25 deg. C / 75% RH
Engineer : Hironobu Ohnishi Takeshi Choda Hironobu Ohnishi
(30-1000MHz) (9k-30MHz, 1-18GHz) (18-40GHz)
Mode : HRP Tx 62.64GHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	95.960	QP	40.7	9.6	7.9	32.2	26.0	43.5	17.5	
Hori	134.340	QP	40.4	14.2	8.4	32.1	30.9	43.5	12.6	
Hori	214.760	QP	38.3	16.9	9.1	32.0	32.3	43.5	11.2	
Hori	357.930	QP	40.0	16.8	10.1	32.1	34.8	46.0	11.2	
Hori	445.487	QP	45.3	18.3	10.7	32.1	42.2	46.0	3.8	
Hori	890.976	QP	35.9	24.0	13.0	31.3	41.6	46.0	4.4	
Hori	1039.481	PK	62.8	23.9	1.6	34.7	53.6	73.9	20.3	
Hori	1484.937	PK	62.2	25.8	2.0	33.4	56.6	73.9	17.3	
Hori	2970.019	PK	54.4	27.9	2.8	32.0	53.1	73.9	20.8	
Hori	3712.385	PK	54.4	29.5	3.2	31.7	55.4	73.9	18.5	
Hori	10151.970	PK	54.8	38.6	-4.1	33.3	56.0	73.9	17.9	
Hori	12527.960	PK	52.4	39.3	-3.5	33.1	55.1	73.9	18.8	
Hori	25056.000	PK	48.1	38.4	-0.8	31.5	54.2	73.9	19.7	
Hori	37584.000	PK	45.4	41.4	0.5	24.2	63.1	73.9	10.8	NS
Hori	1039.481	AV	56.9	23.9	1.6	34.7	47.7	53.9	6.2	
Hori	1484.937	AV	58.3	25.8	2.0	33.4	52.7	53.9	1.2	
Hori	2970.019	AV	46.6	27.9	2.8	32.0	45.3	53.9	8.6	
Hori	3712.385	AV	39.8	29.5	3.2	31.7	40.8	53.9	13.1	
Hori	10151.970	AV	49.8	38.6	-4.1	33.3	51.0	53.9	2.9	
Hori	12527.960	AV	49.5	39.3	-3.5	33.1	52.2	53.9	1.7	
Hori	25056.000	AV	36.9	38.4	-0.8	31.5	43.0	53.9	10.9	
Hori	37584.000	AV	32.7	41.4	0.5	24.2	50.4	53.9	3.5	NS
Vert	94.620	QP	43.4	9.3	7.9	32.2	28.4	43.5	15.1	
Vert	134.340	QP	44.2	14.2	8.4	32.1	34.7	43.5	8.8	
Vert	214.760	QP	41.2	16.9	9.1	32.0	35.2	43.5	8.3	
Vert	357.930	QP	32.9	16.8	10.1	32.1	27.7	46.0	18.3	
Vert	445.487	QP	36.3	18.3	10.7	32.1	33.2	46.0	12.8	
Vert	890.976	QP	34.3	24.0	13.0	31.3	40.0	46.0	6.0	
Vert	1039.481	PK	63.7	23.9	1.6	34.7	54.5	73.9	19.4	
Vert	1484.937	PK	57.9	25.8	2.0	33.4	52.3	73.9	21.6	
Vert	2970.019	PK	55.9	27.9	2.8	32.0	54.6	73.9	19.3	
Vert	3712.385	PK	57.4	29.5	3.2	31.7	58.4	73.9	15.5	
Vert	10151.970	PK	54.0	38.6	-4.1	33.3	55.2	73.9	18.7	
Vert	12527.960	PK	49.0	39.3	-3.5	33.1	51.7	73.9	22.2	
Vert	25056.000	PK	48.5	38.4	-0.8	31.5	54.6	73.9	19.3	
Vert	37584.000	PK	45.2	41.4	0.5	24.2	62.9	73.9	11.0	NS
Vert	1039.481	AV	57.5	23.9	1.6	34.7	48.3	53.9	5.6	
Vert	1484.937	AV	52.9	25.8	2.0	33.4	47.3	53.9	6.6	
Vert	2970.019	AV	53.2	27.9	2.8	32.0	51.9	53.9	2.0	
Vert	3712.385	AV	42.2	29.5	3.2	31.7	43.2	53.9	10.7	
Vert	10151.970	AV	48.9	38.6	-4.1	33.3	50.1	53.9	3.8	
Vert	12527.960	AV	43.0	39.3	-3.5	33.1	45.7	53.9	8.2	
Vert	25056.000	AV	36.7	38.4	-0.8	31.5	42.8	53.9	11.1	
Vert	37584.000	AV	32.8	41.4	0.5	24.2	50.5	53.9	3.4	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

*NS: No signal detect.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Spurious Emission (above 40GHz)

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 31JE0273-HO-01
Date 08/03/2011 08/04/2011 08/05/2011
Temperature/ Humidity 24 deg. C / 65% RH 24 deg. C / 55% RH 25 deg. C / 75% RH
Engineer Hironobu Ohnishi Hironobu Ohnishi Hironobu Ohnishi
(50-75GHz) (75-200GHz) (40-50GHz)
Mode Tx

[Tx 60.48GHz]

Frequency [GHz]	Measurement Distance [m]	Measured Power [dBm]	Rx Antenna Gain [dBi]	System Loss [dB]	LNA Gain [dB]	Free field Attenuation [dB]	EIRP		Specification Distance [m]	Power Density [pW/cm ²]	Limit [pW/cm ²]	Ant. Pol.	Ant. Height [cm]	Table Angle [deg.]	Remarks
48.384	1.0	-55.99	23.46	12.46	22.87	66.14	-23.73	0.004	3.0	3.7	90	Hori.	150	60	
48.384	1.0	-56.70	23.46	12.46	22.87	66.14	-24.44	0.004	3.0	3.2	90	Vert.	150	0	No signal.

Calculating formula:

$$\text{Free Field Attenuation} = 10 * \log((4 * \pi * \text{Measurement Distance} / \text{lambda})^2)$$

$$\text{EIRP} = \text{Measured Power} - \text{Rx Antenna Gain} + \text{System Loss} - \text{LNA Gain} + \text{Free Field Attenuation}$$

$$\text{Power Density} = \text{EIRP} / (4 * \pi * \text{Specification Distance}^2)$$

[Tx 62.64GHz]

Frequency [GHz]	Measurement Distance [m]	Measured Power [dBm]	Rx Antenna Gain [dBi]	System Loss [dB]	LNA Gain [dB]	Free field Attenuation [dB]	EIRP		Specification Distance [m]	Power Density [pW/cm ²]	Limit [pW/cm ²]	Ant. Pol.	Ant. Height [cm]	Table Angle [deg.]	Remarks
50.112	1.0	-84.34	22.62	45.56	26.55	66.44	-21.50	0.007	3.0	6.3	90	Hori.	151	0	
50.112	1.0	-91.38	22.62	45.56	26.55	66.44	-28.54	0.001	3.0	1.2	90	Vert.	148	359	
64.033	1.0	-82.56	24.70	45.77	25.63	68.57	-18.55	0.014	3.0	12.3	90	Hori.	157	0	

Calculating formula:

$$\text{Free Field Attenuation} = 10 * \log((4 * \pi * \text{Measurement Distance} / \text{lambda})^2)$$

$$\text{EIRP} = \text{Measured Power} - \text{Rx Antenna Gain} + \text{System Loss} - \text{LNA Gain} + \text{Free Field Attenuation}$$

$$\text{Power Density} = \text{EIRP} / (4 * \pi * \text{Specification Distance}^2)$$

* The peak density is less than the average limit.

Receiver Spurious Emission

Transmitting and receiving is operating simultaneously. The limits are same as transmitter spurious emission limits. Therefore, these results were included within transmitter results.

Frequency Stability

Test place Head Office EMC Lab. No.6 Shielded room
Report No. 31JE0273-HO-01
Date 08/10/2011
Temperature/ Humidity 25 deg. C / 60% RH
Engineer Hironobu Ohnishi
Mode HRP Tx 60.48GHz

Test Condition		Center Frequency [GHz]	Frequency Difference [kHz]
Temperature [deg. C.]	Power Supply [V]		
50	120.0	60.479930	+ 135
40	120.0	60.479805	+ 10
30	120.0	60.479790	- 5
20	120.0	60.479795	Reference
10	120.0	60.479810	+ 15
0	120.0	60.479800	+ 5
-10	120.0	60.479805	+ 10
-20	120.0	60.479795	+ 0
20	102.0	60.479780	- 15
20	138.0	60.479780	- 15

Calculating formula:

$$\text{Frequency Difference} = \text{Center Frequency} - \text{Reference Value}$$

Group Instllation

There are no external phase-locking inputs in this EUT.
Therefore, the EUT complies with this requirement.

Transmitter Identification

Not applicable.

The EUT is part of a WVAN (Wireless Video Area Network). All components of the WVAN are for indoor operation only.
There are no outdoor units and therefore no transmissions are directed outside the building.

APPENDIX 3: RF Exposure

[FCC rule]

§1.1310 Radiofrequency radiation exposure limits.

The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Note 1 to Table 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2 to Table 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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[IC rule]

RSS-102

§4 Exposure Limits

For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

§4.2 RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Averaging Time (minutes)
0.003-1	280	2.19	-	6
1-10	280/ <i>f</i>	2.19/ <i>f</i>	-	6
10-30	28	2.19/ <i>f</i>	-	6
30-300	28	0.073	2*	6
300-1500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1500-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}

Note: *f* is frequency in MHz.

* Power density limit is applicable at frequencies greater than 100 MHz.

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[Results]

Mode	Peak EIRP		Separation Distance [cm]	FCC		IC	
	[dBm]	[mW]		Power Density [mW/cm ²]	Limit [mW/cm ²]	Power Density [W/m ²]	Limit [W/m ²]
LRP	29.81	957.7	20	0.191	1	1.905	10

Calculating formula:

$$\text{Power Density} = \text{Peak EIRP} / (4 * \pi * \text{Separation Sistance} ^ 2)$$

* The peak power density complies with average limits.

Mode	Average EIRP		Separation Distance [cm]	FCC		IC	
	[dBm]	[mW]		Power Density [mW/cm ²]	Limit [mW/cm ²]	Power Density [W/m ²]	Limit [W/m ²]
HRP	27.74	594.6	20	0.118	1	1.183	10

Calculating formula:

$$\text{Power Density} = \text{Average EIRP} / (4 * \pi * \text{Separation Sistance} ^ 2)$$

APPENDIX 4: Test instruments

EMI test equipment [1/2]

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE, CE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE, CE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE, CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE, CE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2011/02/15 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE, CE	2010/10/27 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2010/10/11 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2010/10/11 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2011/03/25 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2011/01/14 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2011/03/04 * 12
LP-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	829425/014	RE	2010/12/08 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/suoform141-PE(1m)/RFM-E121(Switcher)	-/04178	RE, CE	2011/07/04 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	RE	2011/03/10 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2010/08/08 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	270875/4(1m) / 284655(5m)	RE	2011/03/02 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2011/03/10 * 12
MHA-10	Horn Antenna	WiseWave	ARH1523-02	10766-02	RE	2010/10/07 * 12
MPA-08	Pre Amplifier	WiseWave	ALN-61226028-51	11576-01-071	RE	2010/08/17 * 12
MMX-01	Preselected Millimeter Mixer	Agilent	11974V-E01	3001A00412	RE	2011/06/13 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	RE	2011/04/22 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	RE	2011/04/22 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE, CE	2010/11/30 * 12
MHA-11	Horn Antenna	WiseWave	ARH1023-02	10766-01	RE	2010/10/07 * 12
MPA-18	Pre Amplifier	AmTechs Corporation	LNA-7511025	9601	RE	2010/08/23 * 12
MMX-02	Harmonic Mixer	Agilent	11970W	2521 A01909	RE	2011/06/14 * 12
MHA-24	Horn Antenna	Custom Microwave Inc.	HO6R	-	RE	2010/09/21 * 12
MMX-03	Harmonic Mixer	OML Inc.	M06HWD	D100709-1	RE	2010/09/27 * 12
MDPLX-01	Diplexer	OML Inc.	DPL26	-	RE	2010/09/30 * 12
MHA-27	Horn Antenna	Custom Microwave Inc.	HO4R	-	RE	2010/09/21 * 12
MMX-04	Harmonic Mixer	OML Inc.	M04HWD	Y100709-1	RE	2010/09/27 * 12

EMI test equipment [2/2]

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MMM-14	DIGITAL HiTESTER	Hioki	3805	070500641	RE	2011/06/06 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE (EUT)	2011/02/20 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2011/02/22 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE (AE)	2011/02/22 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2011/01/05 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2011/06/17 * 12
MHA-07	Horn Antenna	Custom	HO22R	10766-01	RE	2010/10/07 * 12
MCC-05	Microwave Cable 1G-40GHz 2m	Storm	421-011 (90-1394-079)	01-12-002	RE	2011/01/20 * 12
MPA-03	Microwave System Power Amplifier	Agilent	83050A	3950M00205	RE	2011/06/15 * 12
MCH-04	Temperature and Humidity Chamber	Tabai Spec	PL-2KP	14015723	RE	2010/08/03 * 12

The expiration date of the calibration is the end of the expired month.

[Below 40GHz]

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

[Above 40GHz]

Acceptance criteria for untraceable equipment was formulated according to ISO/IEC 17025 5.6.2.2.2, and the regular inspection was performed based on it annually.

For 40-110GHz, power sensor is calibrated by manufacturer, and the measured calibration data is used as in-house reference. The calibration data by manufacturer is checked for acceptance by a calorie meter except for some frequency bands.

For above 110GHz, output level of millimeter wave source module is used as the reference, and inspection by the calorie meter is performed.

Electric power is checked with the calorie meter by measuring resistance and voltage of reference resistor.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: CE: Conducted Emission
RE: Radiated Emission

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